Punji Stick Wounds:

Experience with 342 Wounds in 324 Patients in Vietnam

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THE CURRENT war in the Republic of Vietnam presents sharp contrasts in weaponry. In opposing an American force equipped with the most sophisticated armamentarium ever used in warfare, the Viet Cong continue to supplement their modern weapons with implements similar to those devised by their ancestors. The punji stick * is among the most effective of these. Despite its simplicity it has been a frequent source of penetrating, perforating or lacerating wounds in members of the Allied Forces. The simplicity of the punji stick as an effective weapon is highlighted when one considers its production cost in relation to U. S. arms. The bamboo itself grows everywhere in great quantity in Vietnam and stakes themselves can be cut, fashioned and even placed by women or children.

The punji stick is a sharpened piece of bamboo varying in length generally from one to two feet but occasionally cut six feet long when used to impale helicopters. When hardened by fire, bamboo will hold an extremely sharp point for long periods of time. The points are often dipped in human or animal excreta in an attempt to increase their wound-potential. To our knowledge, no commercial or natural-occurring poisons similar to the curare used on arrow tips by certain South American tribes have been employed on punji sticks.

The standard leather combat boots and the relatively new canvas-topped jungle boots are readily penetrated except where steel inserts are used to protect the sole of the foot. Most commonly the punji stick is found protruding at an angle of 20 to 60 degrees from the ground along a jungle path. At various times U. S. soldiers have tried to protect their legs by using size ten food cans, from which the top and bottom have been removed, to act as a metal sleeve protector. This innovation was prompted by the Viet Cong use of the punji bear trap (Fig. 1), a device in which a weakened central portion of board or a wire sling gives way on slight pressure to allow bilateral impaling of a lower extremity by multiple sharp points.

We have recognized the strategic placement of the punji stick as being responsible for its effectiveness in removing the soldier from combat status. Although originally set primarily along trails (Fig. 2), their greatest damage of late has been in the area immediately surrounding helicopter landing zones. Since the helicopter must move swiftly away from the zone and the troops must disperse and take cover quickly, a favorite technic of the Viet Cong is to fire into the area at this particular time distracting the troops who scatter into the myriads of pre-set stakes. At this time also

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* Punji (pungee) a sharpened bamboo stick originally used in the Punjab in animal traps.

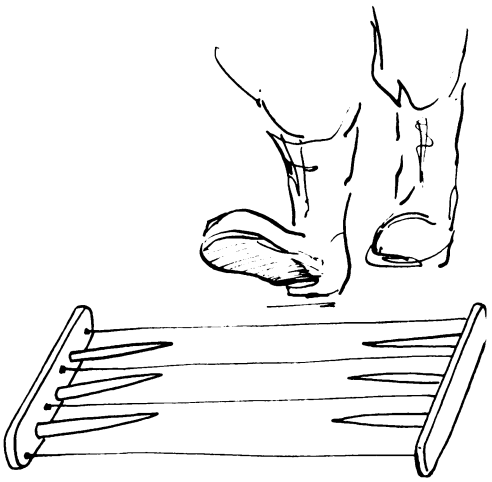

FIG. 1. Punji bear trap.

the preoccupied soldier is especially apt to fall prey to the camouflaged punji pit (Fig. 3) in which he may be injured initially by the vertical sticks in the base of the pit or secondarily by the lateral downward positioned sticks as an attempt is made to withdraw the extremity.

The helicopter itself is not immune to damage by a giant form of punji stick which can penetrate the ship and indeed can injure passenger personnel. This happens rarely and usually results when the ship has to land in a field of tall elephant grass which is ideal for obscuring even large, stout stakes.

A particularly effective use of the punji stick is to establish their obvious presence by placing them in a stream or in a low grassy area (Fig. 4). As these are avoided, the unsuspecting soldier is injured by other sticks submerged in the stream or in a camouflaged punji pit or punji bear trap device. Avoidance of obvious punji sticks may also lead an individual into a mine or other hidden explosive booby-trap.

While the punji stick has a fixed locus, it has also been employed in a variety of moving devices. Singly it can be propelled in arrow fashion as from a bamboo tube (Fig. 5). More often it appears in the form of a multi-staked device which is released by a tripwire or by direct pressure. The tripwire may activate a form of mace which consists of circumferential punji sticks protruding from a heavy mud ball which usually gains striking momentum as it swings in a long downward arc along a trial (Fig. 6). Or the wire may release a punji board which is whipped with great force at its locus at the end of a tightly tethered green bamboo stalk (Fig. 7). Direct pressure from a footstep may set into motion a punji tiltboard which is designed to strike the individual in the face, chest or abdomen (Fig. 8).

FIG. 2. Punji sticks along trail or stream bank blend in with grass.

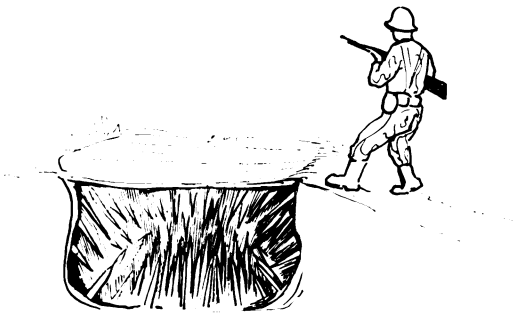

FIG. 3. Punji pit.

Clinical Material

A total of 324 patients with punji stick wounds were treated at the 2d Surgical Hospital in support of the 1st Cavalry Division (Airmobile) in the Central Highlands of the Republic of Vietnam from January through September, 1966. This represents approximately 16% of the total hospital admissions and 38.1% of the 850 wounds due to hostile action. During one 72-hour period a total of 65 patients were admitted with punji stick wounds.

The typical wound usually measured ½ to 2 cm. The depth, however, varied and through and through wounds were frequently encountered (Fig. 9). Occasionally a patient had multiple punji stick wounds and two patients each sustained three punji stick wounds in widely separated anatomic areas.

Regional distribution of these wounds is documented in Table 1. The leg was the body area most frequently wounded in this series: 60.2% of the total. The thigh and ankle were commonly involved. However there were occasional wounds of the scrotum, palate, face and perianal region. The palate wound occurred when a soldier fell with his mouth open onto a punji stick. Although not included in this series, a punji stick perforation of the rectum via the anus was encountered at a nearby hospital.

The lag time from injury to arrival at the 2d Surgical Hospital is recorded in Table 2. Rapid helicopter evacuation of the injured was hampered infrequently by bad weather and heavy enemy fire. Initial therapy of tetanus toxoid boosters and antibiotics was administered to 82% of the patients prior to arrival at our hospital.

At the time of admission eight patients had infected punji stick wounds with retained punji fragments in three wounds. Five patients had delayed their treatment from 4 to 9 days. Three patients had previously had inadequate debridement of the wounds at other medical facilities.

FIG. 4. In avoiding the obvious punji sticks, the soldier is injured by the submerged hidden ones.

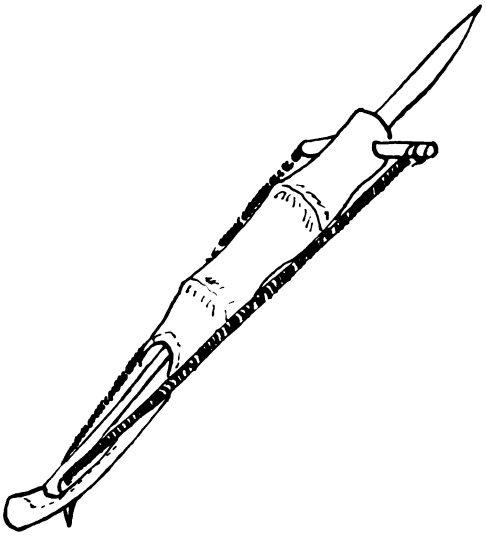

FIG. 5. Bamboo tube or sleeve for propelling punji stick in arrow fashion.

Treatment

Treatment of the fresh punji stick wound is relatively simple if properly performed and one adheres to the basic principles of treatment of war wounds. This consists of adequate debridement and creation of an open wound which has been well irrigated. Local anesthesia is usually adequate with spinal anesthesia being reserved for deep lower extremity wounds, and for those involving the knee or ankle joint. Penrose drains were used in deep wounds when indicated, and packing of the wounds was avoided. Delayed primary closure was performed on the fifth postoperative day if there was no contraindication.

Unless otherwise dictated by a history of sensitivity, all patients received penicillin and streptomycin, usually given intramuscularly as 600,000 units of penicillin and 500 mg. of streptomycin at 12-hour intervals for 5 days. Patients with deep wounds and wounds violating a joint were given the theater-approved treatment for more serious wounds, consisting of intravenous penicillin in doses of 20 to 30 million units daily for 3 days followed by the intramuscular regimen noted above. There were no adverse drug reactions. All patients who had not received tetanus toxoid prior to admission were given a booster dose.

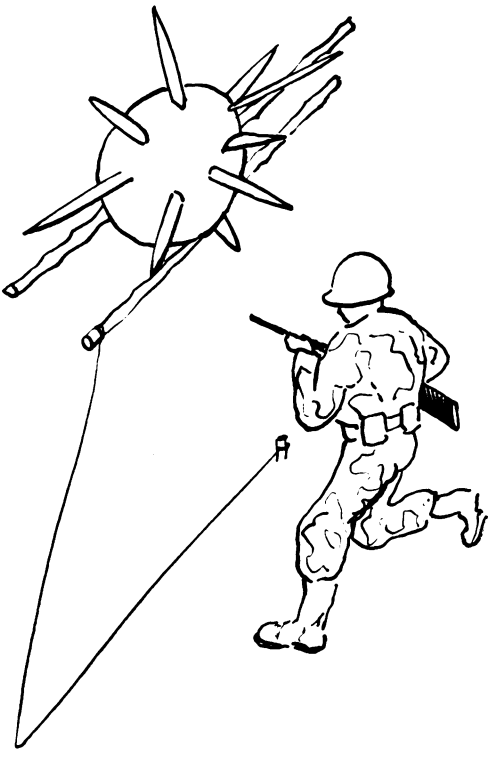

FIG. 6. Mace of heavy ball of protruding punji sticks.

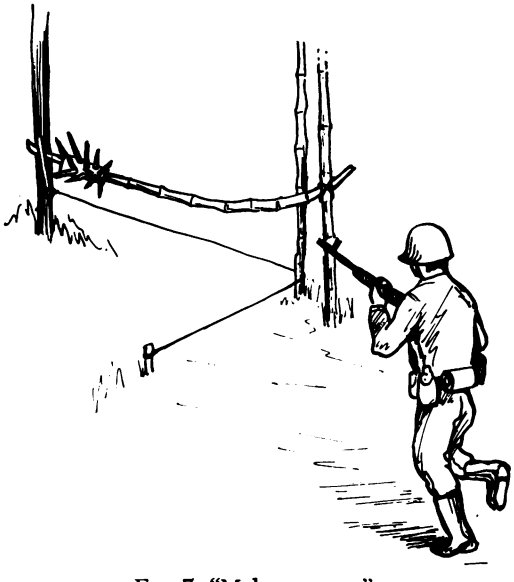

FIG. 7. "Malayan gate."

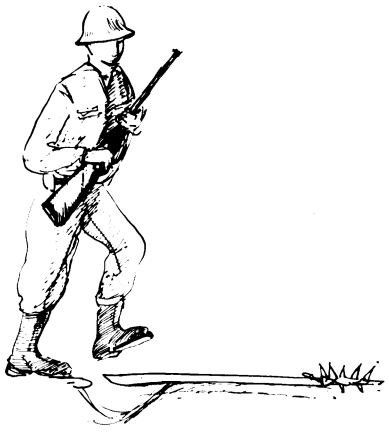

FIG. 8. Punji tiltboard.

Arthrotomies were performed in the 14 cases of joint involvement. Following irrigation of the joint with a saline solution containing 10 million units of penicillin, the joint capsule was closed. The remainder of the wound was left open for delayed primary closure at the appropriate time.

A most important aspect of the initial debridement is the search for and removal of any retained punji stick fragments. There were 12 such instances in this series. Of these, three were the result of inadequate debridements at other medical facilities. The remaining nine were removed at this facility at the initial debridement. Anatomic distribution in the retained fragment cases include nine in the leg, two in the hand and one in the knee joint.

Physical therapy in the form of progressive exercises was thought to be important for many patients, particularly for those with punji stick wounds of the anterior compartment of the leg. Because of local discomfort on flexing the ankle, patients with such wounds tended to walk stiffly favoring the injured side. Such adjunctival aids as local cryotherapy, hydrotherapy or heat application were not believed necessary.

We were informed of several instances of satisfactory wound healing when surgical treatment had not been employed by the responsible physicians and of patients who were isolated from medical care at the time of punji stick injury, yet whose wounds healed satisfactorily. While it is possible that certain very superficial wounds demand no extensive debridement, it is believed unwise to neglect a known dirty and potentially dangerous and incapacitating injury.

Discussion

X-ray proved to be of no value even with soft tissue technics and even when a protruding punji stick remnant served as a guide. No bone trauma was found in any of the 342 injuries. It is unfortunate that x-ray could not have been of value in any of the 12 cases with retained fragments. Of these, three had undergone previous debridement at another medical facility. The case which focuses the most attention on the retained punji fragment is a soldier who, following a typical injury in the leg, developed a draining sinus. According to his military health record he was examined 24 times at several medical facilities and had had various non-surgical treatments. On his initial visit to this facility a retained 1×2.5 cm. typical punji stick tip was removed and the sinus subsequently closed.

Although it would be of doubtful value, it might be of some academic interest to perform bacteriologic studies of all punji stick wounds. All such wounds are consid-

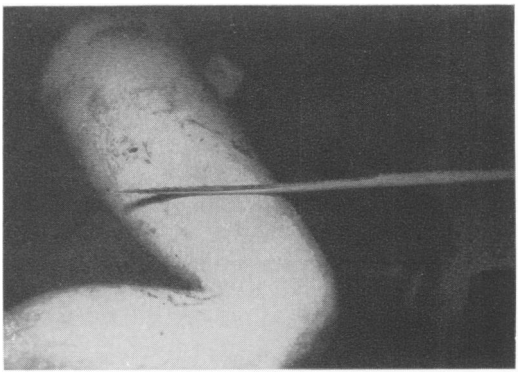

FIG. 9. Through and through punji stick wound of leg.

TABLE 1. *Regional Distribution of 342 Punji Stick Wounds in 324 Patients*

Foot	38
Ankle	22
Leg	206
Knee	26
Thigh	29
Scrotum	1
Buttocks	2
Hand	12
Arm	5
Palate	1
	342
Double wounds	14
Triple wounds	2
Total patients	324

TABLE 2. *Time Lag from Injury to Arrival at 2d Surgical Hospital*

2 hours or less	40%
2 to 5 hours	40%
5 to 12 hours	12%
12 to 24 hours	4%
Greater than 24 hours	4%

TABLE 3. *Associated Injuries Caused by Punji Sticks*

Knee joint penetration	12
Ankle joint penetration	1
Wrist joint penetration	1
Nerve contusion	1
Laceration saphenous vein	1
Laceration anterior tibial artery and vein	1

ered contaminated and treated as such, and the only possible difference a bacteriologic study might make would be in the so-called routine antibiotics given to an individual. Since this information was not available in the combat situation, all patients received penicillin and streptomycin.

Infection following treatment occurred in nine patients, representing 2.6% of all punji stick injuries. Eight of these responded readily to treatment while one patient required three operative procedures for recurrent infection, the final curative operation involving wide excision. There was no retained foreign matter in this case.

One patient subsequently developed an arteriovenous fistula between the posterior tibial artery and vein which was successfully treated at a medical facility farther along the medical chain of evacuation.

Table 3 lists injuries in this series associated with punji stick wounds. Joint penetrations occurred in 14 cases: 12 in the knee, one in the wrist, and one in the ankle. The anterior tibial artery and vein were lacerated in one patient and the greater saphenous vein was lacerated in another. Of interest, but not included in this series, was an unusual case involving an invaluable army scout dog who sustained two punji stick wounds of the thorax while swimming across a stream and developed a hemothorax. He was returned to duty in six weeks.

The average hospital stay of individuals returning to duty locally was 12.3 days following which a 7- to 10-day convalescent period of "light duty" was granted prior to return to combat. Those patients developing infection required an average of 20 hospital days. The overall average ineffective duty time was 3 weeks. Fourteen patients were evacuated farther to the rear: three were sent to malaria treatment centers, two were granted emergency leave to the United States, four required a prolonged holding time because of knee joint penetration, and the rest were included in groups sent out to gain bed space at times when large numbers of casualties were being received.

Summary

The punji stick as used in Vietnam is a very highly effective enemy implement of war as evidenced by the elimination of 324 troops from combat for an average of three weeks each.

It presents no problems when managed properly by practicing the well-known principles of treatment of war wounds.

Because there was no reference to this significant entity in the medical literature it was felt worthwhile to document an experience with 342 injuries in 324 patients.